

Description

[REPLACEABLE GOLF CLUB FACE AND PROTECTIVE SHIELD]

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] Priority is hereby claimed from provisional patent application number 60/407669 filed on 09/03/2002, and also from provisional patent application number 60/407620 filed on 09/03/2002.

BACKGROUND OF INVENTION

[0002] FIELD OF THE INVENTION

[0003] A device for attaching to the face of a golf club, and more particularly, a device which enables a golf club to function as if it were new.

[0004] BACKGROUND OF THE PRESENT INVENTION

[0005] The popular game of golf is normally played on an outdoor course of 18 holes. The idea is to put the golf-ball into a hole or cup at the end of each of these 18 legs. A player uses a variety of clubs or golf tools to enable them

to strike the ball with precision in order to utilize the least strokes. It is therefore the goal of each manufacturer to provide the golfer the best possible tools to accomplish this task.

- [0006] New technology has changed the game by employing new materials. These include the metals or composites in the shafts and in the club heads. The golf club face or striking surface, is prone to wear & polishing from the repetitive hits on the ball & terrain. Independent tests prove that standard steel, titanium or similar clubs may be worn in about 50 100 hits or in about 5 rounds of golf for the average player.
- [0007] The golf club striking surface needs improvement, plus there is a need for protection to be imparted to the club-face from further wear & damage.
- [0008] The USGA and the Royal & Ancient Golf Club of St. Andrews govern the rules and standards of the game and have established certain standards for the roughness on golf club faces.
- [0009] As the face of the golf club wears, it loses the Spin-Generating Traction of the face and the standards set by the USGA. The USGA rules state, "A club which conforms with the rules when NEW is deemed to conform after wear

through normal use." This is fine except it has affected the player's abilities to play well.

- [0010] There is a need for spin generating surfaces and designs, that may be applied to such a face quickly & easily by anyone without tools or special skills to restore the club face to the desired spin generating abilities or conform to the USGA roughness specifications. There is a need to have a means for replacing such surfaces and designs with identical products as wear or stubborn soil causes change, such that a consistent playing surface can be maintained. Attempts in the past have failed due to the loss of energy transfer, from the clubface to the ball, causing the ball to fall short due to loss in velocity. In addition, unwanted debris filled the cavities in the surface changing the traction or grip characteristics of the surface. The continuing impacts of the ball will also loosen the granular structure causing their loss, affecting both the energy transfer & backspin. It is also felt that due to the large variety of clubface shapes & designs, large varied inventories would be necessary causing confusion in the selection.
- [0011] About 2 yards is lost in distance for each 1% of lower COR with swing speeds of about 100 120 mph.

- [0012] The first rule of ball flight is, "Overcome Gravity." Gravity is a constant vertical force downward. Any shot that hopes to overcome gravity must have a greater upward vertical force.
- [0013] To overcome this force lift is necessary.
- [0014] The second rule is Drag or the Resistance of the atmosphere on the ball moving thru it. This causes friction with the air causing deceleration, reducing its Velocity & Spin. Velocity is also reduced by the air pressure in front of the ball along with the vacuum or suction behind it.
- [0015] There are three initial performance parameters that help to overcome the forces of Gravity and Drag. These are Launch Angle, Spin Rate and Ball Speed.
- [0016] The Ball Launch Angle, is determined by the Clubs Loft Angle, the Center Of Effort or Center of Mass of the club and the characteristics of the golf ball. Lower Center Of Effort and Higher Club Loft Angle both generate Higher Ball Launch Angle trajectory.
- [0017] Spin Rate is generated by a combination of Swing Speed, COR, & Loft Angle & the Traction of the ball on the club-face. Harder, faster swings, as well as greater higher lofted clubs along with higher COR will produce Higher Spin Rates and more Lift. Spin Rate is a measure of how

fast a ball turns around its axis, measured in RPMs (Revolutions Per Minute) Typically NEW drivers will spin a ball at about 2000 to 5000 RPM while NEW Wedges with a greater loft may spin at 10,000 RPM.

- [0018] Ball Speed is generated by Swing Speed, COR of the club-head and characteristics of the ball. Higher Swing speeds & COR produce Higher Ball Speed and Spin Rates.
- [0019] Lift is created by Backspin. It occurs at an angle perpendicular to the balls spin axis, typically upward. Higher Spin Rates produce Greater Lift. A golf ball has dimples that enhance its aerodynamics in flight. They create a turbulent boundary layer of air around a spinning golf ball allowing it to slice thru the air with less resistance smoothing out airflow. Lift occurs because the backspin rotation of the ball causes on-coming air to pass more quickly over the top half of the ball, generating lower pressure on top & greater pressure below, thus lifting the ball.
- [0020] A High Spin Rate will overcome gravity, causing the ball to climb during its initial trajectory. The backspin will make a golf ball fly further, straighter & with more control. In the short game, it will permit a softer landing and with more control closer to the pin with minimum roll.
- [0021] Worn or polished golf club faces will not have sufficient

traction to produce the desired backspin. It is recommended by golf authorities to have the clubfaces restored to their original USGA specifications for NEW clubs at least once each year. This is usually a task that most golfers do not do because, they have not been properly advised or don't know. The wear is so gradual, that many will not understand why their game is suffering.

- [0022] Resurfacing or restoring the clubface entails that the clubs be sent or taken to a Qualified Golf Repair Shop. The standard method for reconditioning the clubface is to have the surface sand or bead blasted. However, in doing so, the edges of the grooves, which produce much of the spin, made the edges even more rounded by the peening of the sand blasting, thereby loosing much of the groove's spin-generating abilities.
- [0023] Resurfacing in this manner may not be consistent or very effective and is an inconvenience, a time with out clubs and it can be expensive, especially if the clubs have to have their grooves milled out. The milling may cause the grooves to be out of the USGA specifications, rendering the club as non-conforming. The USGA rules state that, "Any part of a club which has been purposely altered is regarded as new and must, in its altered state, conform to

the rules." That could mean that resurfacing as suggested could require the purchase of new clubs if one is to be in conformance. The shape, Width, Depth, corner dimensions and distance from one another are carefully illustrated & shown in the rules, making milling where material must be removed difficult if not impossible unless the entire face is first milled. This process may well exceed the cost of a new club.

- [0024] Some of the leading golf companies such a PureSpin,™ Carbite™ & Taylormade™ are providing New Golf Clubs with Backspin Enhancement & Longer Wear characteristics, but you have to purchase their "New Clubs" to get these benefits.
- [0025] Related patents are the following: Patent number 5,688,190, issued to Rowland et al. on November 18, 1997, describes a ribbed adhesive backed pad for the face of a golf club. Unlike the present invention, by providing ribs, Rowland et al.'s device is not suitable for restoring the face of a golf club to its new or unadulterated state. Rather, Rowland's device modifies an existing club to allow it to perform as desired by the user, as opposed to the club's own specifications.
- [0026] Patent number 5,690,561, issued to Rowland et al. on

November 25, 1997, is directed to a two-sided pad that goes onto the face of a golf club. Unlike the present invention, Rowland et al. has ridges that add additional friction to the face of a golf club, as opposed to restoring it to its new condition by merely increasing friction where friction was intended.

- [0027] The above patents and concepts do not provide consistency, but add more variables to a game that already has too many. They do not take into consideration the effects of their materials on the performance of distance, control, debris accumulation, etc. They only refer to backspin and not to any specification or standard.
- [0028] Patent number 5,804,272, issued to Shrader on September 8, 1998, shows a backspin sticker in combination with a golf club. Unlike the present invention, Shrader's device is intended to provide a variety of faces for a single golf club so that a single golf club can be employed for an entire round of golf. Shrader's device, unlike the present invention, is to be applied and removed repeatedly, such that there is no concept of restoring a club to its initial face before wear and tear.
- [0029] Patent number 4,768,787, issued to Shira on September 6, 1988, describes a golf club with a high friction striking

face. Unlike the present invention, Shira's device does not contemplate separate faces for golf clubs that can be replaced or used for a short duration of time so that the face can be returned to its unadulterated form.

[0030] Patent number 4,917,384, issued to Caiati on April 17, 1990, shows a golf club with an improved face. Unlike the present invention, Caiati's device does not contemplate separate faces for golf clubs that can be replaced or used for a short duration of time so that the face can be returned to its unadulterated form.

SUMMARY OF INVENTION

[0031] A surface for application to the face of a golf club so that the face performs if it were new. The surface allows the face to perform like or to the face's original specifications.

[0032] In one embodiment of the present invention, one side of the present invention has an adhesive layer so that it can securely, but removable, attach to the face of a golf club. The other side of the present invention has a surface that conforms to the friction equivalent to the face of a new golf club.

BRIEF DESCRIPTION OF DRAWINGS

- [0033] Figure 1 shows grains, fill and the carrier.
- [0034] Figure 2 shows grains, fill, carrier and a slurry coating.
- [0035] Figure 3 shows the top view of the preferred shapes of the present invention

DETAILED DESCRIPTION

- [0036] In order to provide a reliable & consistent backspin producing surface that may be applied to virtually any golf club face, new or used, easily & inexpensively, we have engineered the following: A simple but effective spin-generating shield, shaped to cover the striking area and offer protection to the face from further wear & damage.
- [0037] In the preferred embodiment of the present invention, the shield 5 consists of a hard micron grains 10, but not brittle to avoid fracturing, bonded with a hard tough resin 20, to a strong, high-impact resisting carrier 30 such as a thin strong metal screen or special non metallic film or sheet. (Paper or soft materials such as Aluminum as a carrier will absorb energy resulting with a loss of COR.) The areas between the select grains 10 are filled to a desired level with a suitable fill 25 so that the valleys between the grains 10 are filled, further bonding the grains 10 to one-another. This reinforces the structure and also prevents

unwanted debris from filling the voids that would cause a change in traction. The fill 25 may be filled or reinforced with micro balloons, fibers, or other reinforcing or extender materials. As wear takes place, the softer fill 25 erodes, exposing more of the harder longer wearing grain 10, insuring continued traction. The fill 25 between the grains 10 could be the bonding resin 20 as well; as in a slurry coating. Pigments may be added to colorize the fill 25 if desired. This can show wear patterns and points where a golf face strikes a golf ball as the pigment be exposed, lighter, and or darker depending upon wear of the present invention. For example, if a golf ball is hit repeatedly, the resin 20 might erode in certain areas on top of and around the grains 10 simply because of wear as the ball hits the fill 25 and grains 10. A pigment aids in assessing wear as the grains 10 could be one color and the resin 20, fill 25 another color.

[0038] The fill 25 fill prevents the golf ball's cover or surface from being greatly penetrated by the grains 10 that would absorb or rob energy in doing so, reducing the COR. The fill 25 also allows the impact pattern to be over a larger effective surface area, spreading the impact so that the supporting carrier 30 receives less grain 10 impact effect

and also transferring more energy, increasing the COR. Smaller grains 10 with more surface points and contact area penetrate the ball less, do less damage to the ball and are more resistant to fracture and will transfer more energy.

- [0039] The surface roughness can be controlled with a combination of sizing the grains 10 and shaping the grains 10, grain 20 orientation, grain 10 proximity to other grains 10, the level of fill 25 and manufacturing methods.
- [0040] The USGA specifications on the roughness is that the surface irregularities that no peak stand more than 180 micro-inches above the average of the rest of them. We are able to have several grain 10 sizes that meet this spec as long as we fill in the valleys in-between the grains 10 to meet the roughness. That is we may select a larger grain 10 that has more distance between them and consequently makes a thicker matrix and requires more fill 25 and conversely, smaller grains 10 with less fill producing a finer, thinner, closer knit surface but still be within the limits with less fill. As mentioned earlier we prefer the smaller grain made by slurry coating.
- [0041] Slurry coating is where the selected grains 10 are mixed into a suitable resin and flowed onto the carrier in the

proper proportions. The grains 10 are like miniature ice-bergs settling onto the carrier.

- [0042] The fill 25 bonds the grains to one another and reinforces the matrix and in filling the cavities, prevents unwanted debris from collecting within these cavities that could then affect the grip or traction on the ball. The fill 25 also makes it easier to keep the clubface clean.
- [0043] The carrier should be strong to resist the impacts, but not really malleable as the ball impacts would cause the carrier to change. If it were in the malleable (aluminum) type the thickness would have to be increased to provide more resistance but it would then add more weight.
- [0044] We try to keep the weight at a minimum. The weight for our heavier duty and longer lasting product that will allow hundreds of hits is more than twice the weight of the thinner face. Our added weight is therefore virtually imperceptible by golfers. A dime is what swing weight is usually measured by.
- [0045] The size or dimensions of the face shields 5 range is preferably from 1.625"/ 2.50"wide with a total height of 2.25"/ 3.50"high for the combination used on the wedges. The lower part used for woods & drivers is from 0.75"/ 1.55" according to the clubs manufactured in to-days

standards.

- [0046] The special shape 50, 60, makes for only one inventory and covers both left and rights for any club. It therefore reduces inventory costs, manufacturing costs, packaging and possible errors of shipping, returns and selection confusion by the customer. A golfer may have various clubs that they use from different manufacturers. With our universal shape there is no confusion or mistakes...they will fit virtually all clubs that we have tried them on.
- [0047] The product is made flat and has a very uniform controlled surface distribution. It will conform to slight curvature in the clubface as some manufacturers have made.
- [0048] In an other embodiment, Hard Crystals such as diamonds are fused or metallurgically bonded to a metal sheet or carrier with a metal matrix. Portions of the Hard Crystals protrude above the matrix to provide the roughness desired and the traction to the ball. Typically such a construction is used in "Sapphire nail-files". The roughness, color and unwanted debris accumulation may be further controlled with a resin fill between the crystals as stated in the embodiments above.
- [0049] Other Replaceable Faces may be made by various manufacturing techniques as extruding, pressing, molding, etc

out of various materials as metals, composites, plastics, ceramics etc.

- [0050] Resilient rebounding materials may also be utilized either as the face or under a new face to provide additional distance to the ball, similar to the effect of the new clubs that have been recently allowed by the USGA.
- [0051] Special attention to the attachment of the shield to the Clubface is also necessary. Most pressure sensitive adhesives are made of soft materials that will cause a loss of energy transfer. This energy attenuation or cushioning, can be reduced with harder & or thinner adhesives, intermediate layers or reinforcements, or by employing other adhesive systems either temporary or permanent, as Waxes, heat activated, epoxies, cyanoacrylate esters or other suitable adhesives.
- [0052] We have not found anything that even comes close to the shape & descriptions nor have the professionals or the golf media that usually would know of such existence now or prior.
- [0053] We have found that the replaceable club faces replicate a new clubs performance very closely and that it is a very good way to see if a golfers clubs are indeed worn by simply testing the distance, control, and backspin of a

used club, recording the test results and then repeating the test with the replaceable clubfaces applied. If the results are such that a large difference is seen between the before and after tests, the golfer should be advised that they are playing with tools or equipment that will affect their scores. The golfer should then make a decision whether to purchase, repair or replace if they play in tournaments. If they are just a regular golfer and only want good tools they could continue to use the replaceable faces. We are working with the USGA and at some time in the future the replaceable faces may be approved for tournament use.

- [0054] The transparency of the carrier 30 allows printing on the carrier 30 so that identifications can be seen thru the face. This is important so that companies that wish to advertise their names or logos or provide these as premiums etc., may do so.
- [0055] We have also demonstrated a metallic appearing clubface where the transparent friction causing materials are employed over a metalized surface, thus allowing the surface seen.
- [0056] The non or less transparent shields may have Logos & names imprinted on their surface, but it is more difficult

due to the roughness. Frequent cleaning & use may remove the markings on the surface.

- [0057] Carrier 30 strength and thickness have an effect on their resistance to shearing over the unsupported area over the grooves. Thinner carriers will shear faster, indicating where the ball was struck by the clubface. This can be a benefit to many players. In using such a material, we recommend that the shields 5 be trimmed using a razor knife or other similar tool over and along the grooves either prior to or after play. In removing the excess, the worn or rounded groove edges become effective once again. The grooves aid in channeling away water in very wet conditions.
- [0058] Using a thicker, stronger carrier 30 will resist the shearing over the groove area and provide a more durable product where trimming over the grooves is not necessary.
- [0059] Grooves are not a requirement per the USGA rules and therefore the existing grooves may be filled with a suitable lasting filler and then covered with the shields 5. A club made without grooves could also be employed. This would eliminate the trimming of the shields and using thinner carriers 30. Patterns on the shield may be employed to provide edge traction and aid channeling or re-

moval of water if desired.

- [0060] Shields are quickly and easily replaced should they show signs of wear, damage or stubborn soil. A new shield 5 is then applied and the club now has the same roughness and spin-generating characteristics as a new club or to a desired specification. This ability will keep a players clubs with a consistent traction & backspin, allowing for greater control & distance, thereby improving their game with fewer required strokes and with a possible cost savings.
- [0061] A replaceable face and covering that may be secured to and over an existing golf club face, thereby becoming the new and only face on the club. (If such a material is used on putters two faces are permitted.)Materials: Metals, Alloys, Plastics, Polymers, Ceramics, Composites, or other composition of matter.
- [0062] Manufactured by: Extruded, Cast, Formed, Machined, Molded, Pressed, Stamped, By converting, Laminating, Printing, Calendering, Transferring, Coating, Etching, Corona or Electrical Discharge, Electrostatic methods, Vacuum Deposition, Plasma Spray, Metallurgical fusion or bonding, Laser, water or fluid jet, Embossing, or other methods to produce the items, the surface and treatments.

[0063] A golf-club face surface, with or without the grooves that can be manufactured to conform to a given standard or specification of surface roughness, impact resistance, replaceability, durability, resilience, Coefficient of Restitution, color, transparency, the filling of the surface to provide added strength, roughness & wear control, and control the accumulation of unwanted soil and debris that could influence ball control.

[0064] A golf-club surface, with or without grooves, that meets the Rules & Standards of golf club faces as set by the USGA and or the Royal & Ancient Golf Club of St. Andrews, which may be affixed or secured to and over an existing golf-club face. After application, which is manufacturing, the pre-existing club-face now becomes the supporting structure and part of the golf-club structure and may no longer be considered a face unless the removable face is removed.

[0065] The golf club has now been purposely altered and manufactured to be in conformance to the USGA and of the Royal & Ancient Golf Club of St. Andrews and is therefore deemed to be in conformance.